

## SYSTEM, APPARATUS AND METHOD FOR CONFIGURING IDENTIFICATION OF A DISPLAY

### DESCRIPTION

#### CROSS-REFERENCE TO RELATED APPLICATION

[Para 1] This application claims the priority benefit of Taiwan application serial no. 92126047, filed September 22, 2003.

#### BACKGROUND OF THE INVENTION

[Para 2] Field of the Invention

[Para 3] The present invention relates to a system, an apparatus and a method for configuring identification (ID) of a display, and more particularly, to a system, an apparatus, and a method for configuring identification for a plurality of displays forming a TV wall.

[Para 4] Description of Related Art

[Para 5] With the progressive advancement of new technologies, different types of advertisement are frequently renewed. Wherein, the display is a commonly used device in the related fields. By combining multiple displays to form a single large screen TV wall, an image originally displayed on a general display is divided into a couple of images, and each of these images is then displayed on each of the displays composing the TV wall, such that the TV wall looks like a large screen TV. Therefore, each display composing the TV wall must have a unique identification (abbreviated as ID hereinafter), thus the image can be transmitted in considering the image signal related to specific

display, and the TV wall can show them into a large image after receiving all specific images. In order to conveniently extend or reduce the quantity of the displays based on the real requirement when building up the TV wall or other purposes, the ID code of the displays are configured as the same code or an empty code when they are being manufactured. However, because of this limitation, the method for configuring a display ID has become a signification topic in building up the TV wall.

[Para 6] In the conventional art, in order to configure different IDs for several displays, the computer is electrically coupled to one of the displays first, and after the configuration is completed, to unplug the cable connecting the computer and the display and to plug the cable connecting the computer and the connection port of another display, and repeatedly unplug and plug other displays. Thus, if the TV wall is composed of several displays, the process of plugging in and unplugging the cable is elaborate. Accordingly, this requires great efforts and is also time consuming.

[Para 7] In summary, the method for configuring different IDs to several displays has following disadvantages: (1) the conventional method requires repeatedly plugging in and unplugging of the connection cable connecting the computer and the displays, and which is no doubt a time consuming and laborious work.

## SUMMARY OF THE INVENTION

[Para 8] Accordingly, the present invention is directed to a system, an apparatus and a method for configuring an ID of a display. According to an embodiment of the present invention, each ID of the displays composing the TV wall can be sequentially configured without repeatedly plugging in and unplugging the connection line or cable to the setting unit and the displays.

[Para 9] According to an embodiment of the present invention, the switch electrically coupled to each display is utilized to sequentially configure an ID to each displays for composing the TV wall.

[Para 10] According to an embodiment of the present invention, the system comprises a setting unit, a plurality of displays and a plurality of switches. The displays are electrically coupled to the setting unit, and the switches are configured in between the setting unit and its corresponding display, wherein each of the switches corresponds to one of the displays and can be turned on or turned off by its corresponding display. Initially, all of the switches are all turned on by its corresponding displays. Next, all microprocessors receive the setting ID instruction from the setting unit. Next, all displays change to ID setting mode and control all switches turn off. The first display receives first ID information from the setting unit. The first ID microprocessor stores the ID in a memory. The first microprocessor quits the ID setting mode and back to normal operation mode. Then, the first microprocessor issues a control signal to turn on the first switch. The first microprocessor replies a signal indicating the setting is completed to the setting unit.

[Para 11] According to the embodiment of the present invention described above, when the setting unit received the replied signal, a subsequent setting ID instruction is issued to next display.

[Para 12] According to the embodiment of the present invention described above, the setting unit comprises a CPU, a memory and a communication interface including a transmitting terminal and a receiving terminal, which are electrically coupled to a receiving terminal and a transmitting terminal of a microprocessor in each display via transmission lines Tx and second transmission lines Rx, respectively.

[Para 13] According to the embodiment of the present invention described above, for first display, a receiving terminal and a transmitting terminal are electrically coupled to the transmitting terminal and the receiving terminal of the communication interface of the setting unit via transmission lines Tx and transmission lines Rx, respectively. In addition, for second display, a receiving terminal of the communication interface is electrically coupled to the transmission terminal of the setting unit via a first switching unit corresponding to the first display.

[Para 14] According to the embodiment of the present invention described above, each display comprises a memory for storing its ID.

[Para 15] According to the embodiment of the present invention described above, a system for configuring a display ID is provided and a setting unit is adapted for performing the ID configuration function. Wherein, the displays are electrically coupled to the setting unit, and the switches are configured in between the setting unit and its corresponding display. Each of the switches corresponds to one of the displays respectively, which can be turned on or turned off by its corresponding display.

[Para 16] In the system mentioned above, when the setting unit issues the setting ID instructions, a subsequent setting ID instruction is issued according to a reply signal sent back by the configured display.

[Para 17] In the system mentioned above, each display is not electrically coupled to the setting unit until the ID configuration of the previous display is completed and the previous switch corresponding to the previous display had been turned off.

[Para 18] In the system mentioned above, each display comprises, for example, a memory for storing its ID.

[Para 19] In the system mentioned above, the switch is, for example, an electronic switch.

[Para 20] In the system mentioned above, the setting unit is, for example, a computer or a portable computer.

[Para 21] The present invention is also directed to a method of configuring a display ID. In this embodiment, a setting system is used to perform the display ID configuration function, wherein the setting system comprises a setting unit, a first display, a second display, a first switch and a second switch. In method of configuring a display ID, according to an embodiment of the present invention, initially, all of the switches are all turned on by its corresponding displays. Next, all microprocessors receive the setting ID instruction from the setting unit. Next, all displays change to ID setting mode and control all switches turn off. The first display receives first ID information

from the setting unit. The first ID microprocessor stores the ID in a memory. The first microprocessor quits the ID setting mode and back to normal operation mode. Then, the first microprocessor issues a control signal to turn on the first switch. The first microprocessor replies a signal indicating the setting is completed to the setting unit.

[Para 22] The setting unit issues a second setting ID instruction to the second display. The second display receives second ID information from the setting unit. The second ID microprocessor stores the ID in a memory. The second microprocessor quits the ID setting mode and back to normal operation mode.

## BRIEF DESCRIPTION OF THE DRAWINGS

[Para 23] The accompanying drawings are included to provide a further understanding of the invention, and are incorporated in and constitute a part of this specification. The drawings illustrate embodiments of the invention, and together with the description, serve to explain the principles of the invention.

[Para 24] FIG. 1 schematically shows a circuit block diagram of a setting unit in the system for configuring a display ID according to an embodiment of the present invention.

[Para 25] FIG. 2A and 2B schematically show diagrams illustrating an operation mode of a first switch in the system for configuring a display ID according to an embodiment of the present invention.

[Para 26] FIG. 3 schematically shows a flow chart illustrating a method of configuring a display ID according to an embodiment of the present invention.

## DESCRIPTION OF EMBODIMENTS

[Para 27] The present invention provides a system and an apparatus for configuration a display ID, suitable for a TV wall composed of a plurality of displays. In the present invention, the unique ID of the display can be directly configured by using a setting unit, such as a computer, without repeatedly plugging in and unplugging the connection lines or cables connecting the setting unit and the connection port of each display. Likewise, all IDs of the displays composing the TV wall can be configured without repeatedly connecting and disconnecting the setting unit with the connection port of each display.

[Para 28] Referring to FIG. 1, a circuit block diagram of a setting unit of the system for configuring a display ID according to an embodiment of the present invention is shown. In the present embodiment, the displays are configured by a setting unit 110 inside a system 100 for configuring display IDs. Wherein, the setting unit 110 comprises a CPU 1102, a memory 1104 and a communication interface 116, wherein the communication interface 116 includes a transmission terminal 112 and a receiving terminal 114 for transmitting and receiving information, respectively. ID information sent from the setting unit 110 is inputted into the displays through the communication interface 116. In the present embodiment, the communication interface 116 are a RS232 and the transmission terminal 112 and the receiving terminal 114 of the communication interface 116 are a RS232 transmission terminal and a RS232 receiving terminal, respectively. In addition, the setting unit 110 may be a PC (Personal Computer), a laptop computer, or any equipment having a processor capable of performing control and calculation functions well known to one of the ordinary skill in the art. However, it is not necessarily limited thereto. In this embodiment, the system for configuring the display ID 100 comprises a plurality of displays 120, 130, 140 and 150. Wherein, the quantity of the displays included in the system 100 depends on the physical design and requirements. A TV wall composed of four displays is exemplified hereinafter for describing the present invention. However, the scope of the present invention is not necessarily limited thereto.

[Para 29] In the present embodiment, two groups of transmission lines Tx and Rx are used in connecting the system for configuring the display ID 100. When building up the system (e.g. the TV wall), the first section of the transmission lines Tx are electrically coupled to a transmission terminal 112 of the setting unit 110, the receiving terminals 126 of display 120 and the input terminal 124A of the switch 124.

[Para 30] The second section of the transmission lines Tx are electrically coupled to the output terminal 124B of the switch 124, the receiving terminals 136 of display 130 and the input terminal 134A of the switch 134.

[Para 31] The third section of the transmission lines Tx are electrically coupled to the output terminal 134B of the switch 134, the receiving terminals 146 of display 140 and the input terminal 144A of the switch 144.

[Para 32] The fourth section of the transmission lines Tx are electrically coupled to the output terminal 144B of the switch 144, the receiving terminals 156 of display 150 and the input terminal 154A of the switch 154.

[Para 33] The transmission lines Rx are electrically coupled to a receiving terminal 114 of the setting unit 110 and the transmission terminals 127, 137, 147, and 157 of each display 120, 130, 140, and 150, respectively. With such electrical coupling between the transmission terminal and the receiving terminal, the instructions or information can be transmitted. A connection port complied with a common transmission protocol, such as a RS232 transmission line commonly used in the industry now, is employed by these two transmission lines Tx and Rx to communication between the transmission terminals and the receiving terminals of the setting unit 110 and displays. However, the transmission lines complied with other transmission protocol also can be applied in the present invention as considering the real requirements. As shown in FIG. 1, the transmission terminal and the receiving terminal of communication interface of the setting unit 110 are electrically coupled with the transmission terminal and the receiving terminal of the displays 120, 130, 140, and 150 via the RS232 communication interfaces 128, 138, 148, and 158, respectively.

**[Para 34]** In addition, Transmission lines Tx coupled the output terminal 134B of a switch 134 to the receiving terminal 146 and the input terminal 144A of a switch 144. Transmission lines Tx coupled the output terminal 144B of a switch 144 to the receiving terminal 156 and the input terminal 154A of a switch 154. In addition, a plurality of control lines 122A, 132A, 142A, and 152A are electrical coupling with the control terminals 125, 135, 145, and 155 of the microprocessors 122, 132, 142, and 152 respectively. The microprocessors 122, 132, 142, and 152 control the switch 124, 134, 144, 154 turning on or turning off. Herein, the switch for example is an electronic switch, and all switches are connected to a power supply for the power required for the switching operation.

**[Para 35]** For the sake of simplicity, in the ID configuration operation of the present embodiment, only the connection between the setting unit 110 and the displays 120 and 130 are described herein. The configuration method for other displays composing the TV wall 100, such as the displays 140 and 150, are the same as it, thus its detail explanation is omitted here.

**[Para 36]** Initially, all of the switches are all turned on by its corresponding displays. The setting unit 110 transmits a setting ID instruction through the transmission terminal 112 of the communication interface 116 and transmission lines TX to all display 120, 130, 140, 150.

**[Para 37]** In the present embodiment, the switch 124 comprises a input terminal 124A and a output terminal 124B and control terminal 125, wherein the input terminal 124A is electrically coupled to the transmission terminal 112 of the setting unit 110, and is selectively coupled to the output terminal 124B. The selective coupling/switching is controlled by the microprocessor 122 inside the display 120. In addition, the switch 134 comprises a input terminal 134A and a output terminal 134B, wherein the input terminal 134A of the switch 134 is electrically coupled to the output terminal 124B of the first switch 124, and is selectively coupled to the output terminal 134B. Similarly, the selective coupling/switching is controlled by the microprocessor 132 inside the display 130.



[Para 38] Referring to both FIG. 2A and 2B, schematic diagrams illustrating an operation mode of a first switch in the system for configuring a display ID according to an embodiment of the present invention is shown. In the present embodiment, regardless of the number of the switches, the operation is same as the switch 124. Therefore, only switch 124 is exemplified herein for explanation. In the present embodiment, the input terminal 124A of the switch 124 is electrically coupled to the output terminal 124B as shown in FIG. 2A, and the input terminal 134A of the switch 13 is electrically coupled to the output terminal 134B. In other words, the setting unit 110 can transmit information to all displays via the transmission lines Tx. Specifically, the CPU 1102(central processing unit) of setting unit 110 transmits the ID information, such as the setting ID instruction, through communication interface to all displays via the transmission lines Tx from the transmission terminal 112 of the communication interface 116. When each display is received the setting ID instructions, then all change to ID setting mode and control all switches turn off.

[Para 39] After it had been switched to the ID configuration mode, the input terminal 124A and the output terminal 124B are not electrically coupled with each other any more due to the open circuit of the switch 124 as shown in FIG. 2A, and the input terminal 134A and the output terminal are not electrically coupled, either. Meanwhile, since all switches are open circuit, that is the contact points inside the switches are not electrically contacted with each other, the display 120 can only receive the ID included in the ID information, and the ID is assigned to the display 120. In an embodiment of the present invention, the ID can be stored in a memory 121 inside the display 120, and the memory 121 can be a non-volatile memory, such that the ID can be permanently preserved.

[Para 40] In the present embodiment, the display 120 includes microprocessor 122, memory 121 and a communication interface 128 including a transmission terminal 127 and a receiving terminal 126. The transmission terminal 127 is electrically coupled to the receiving terminal 114 of communication interface 116 of the setting unit 110 via transmission lines

Rx. The receiving terminal 126 is electrically coupled to the transmission terminal 112 of communication interface 116 of the setting unit 110. At first, when the microprocessor 122 receives the setting ID instruction sent by the setting unit 110 from the receiving terminal 126 and the transmission lines Tx, a control signal is transmitted to the control terminal 125 of the switch 124 via the control line 122A so as to turn on the switch 124.

[Para 41] The microprocessor 122 assigns this ID to the memory 121 of the display 120 according to the transmitted ID information. After the configuration is completed, a reply signal is issued from the microprocessor 122 through transmission terminal 127 and the operation mode is switched back to the normal operation mode. Meanwhile, a control signal is transmitted to the control terminal 125 of the switch 124 via the control line 122A to turn on the switch 124. In other words, the input terminal 124A and the output terminal 124B are electrically coupled with each other from its original non-connection status. And the first microprocessor 122 replies a signal indicating the setting is completed to the setting unit 110.

[Para 42] According to an embodiment of the present embodiment, the microprocessor 132 inside the display 130 also comprises a transmission terminal 137 and a receiving terminal 136. Wherein, the transmission terminal 137 is electrically coupled to the receiving terminal 114 of the setting unit 110 via the transmission lines Rx. The receiving terminal 136 is electrically coupled to the transmission terminal 112 of the setting unit 110 via the switch 124.

[Para 43] After the setting unit 110 receives the signal sent by the microprocessor 122. Next, setting unit 110 issues another ID information to display 130.

[Para 44] The microprocessor 132 receives the ID information for the display 130. More specifically, the microprocessor 132 assigns this ID for display 130 according to the received ID, for example, to save it in a memory 131 inside the display 130. After the configuration is completed, a reply signal is issued from the microprocessor 132 through the communication interface 138 and the transmission terminal 137 to the setting unit 110, such that the operation

mode is switched back to the normal operation mode. Meanwhile, a control signal is transmitted to the control terminal 135 of the switch 134 via the control line 132A to turn on the switch 134 and in the meanwhile, the input terminal 134A and the output terminal 134B become electrically coupled with each other from their original non-connection status.

[Para 45] Thus, for the two displays (other display can be so implemented described above) can be sequentially configured using the setting unit 110 via the communication interface 116 as well as the transmission lines Tx and Rx. For example, the setting unit 110 configures the ID for the display 120 first, and then configures the ID for the display 130, and continues sequentially configuring the IDs for the displays 140, 150 and the remaining displays of the TV wall 100. According to an embodiment of the present invention, the IDs are respectively stored in the memories 121,131,141,151 inside the displays. By using the switches, it is possible to prevent the display other than the intended display from receiving the instruction.

[Para 46] Referring to FIG. 3, a flow chart illustrating a method of configuring an ID for display according to an embodiment of the present invention is shown.

[Para 47] According to an embodiment of the present embodiment, before configuring the displays, all switches are turned on (step s302). Next, all microprocessors receive the setting ID instruction from the setting unit (step s304). Next, all displays change to ID setting mode and control all switches turn off (step s306). The first display receives a first ID information from the setting unit (step s308). The first ID microprocessor stores the ID in a memory (step s310). The first microprocessor quits the ID setting mode and back to normal operation mode (step s312). Then, the first microprocessor issues a control signal to turn on the first switch (step s314). The first microprocessor replies a signal indicating the setting is completed to the setting unit (step s316).

[Para 48] After the setting unit had received the reply signal, the setting unit reissues the second ID information to the second display as shown in FIG. 1.

Accordingly, the setting unit sequentially configures the IDs for all displays until all the displays have been configured with respective IDs.

[Para 49] In summary, the system, apparatus, and method configuring display ID provided by the present invention at least have following advantages.

[Para 50] (1) By applying the system, apparatus, and method of configuring the display ID according to the present invention, the time and labor consuming operation of repeatedly plugging in and unplugging of the connection cable connecting the setting unit and the connection port of each display via connection cable can be eliminated.

[Para 51] (2) The system, apparatus, and method of configuring the display ID according to the present invention allow the computer arbitrarily assign an ID to each of the displays and implement the update in a very efficient way.

[Para 52] Although the invention has been described with reference to a particular embodiment thereof, it will be apparent to one of the ordinary skill in the art that modifications to the described embodiment may be made without departing from the spirit of the invention. Accordingly, the scope of the invention will be defined by the attached claims not by the above detailed description.